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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/896,684	06/28/2001	Kenneth W. Brinkerhoff	MRNRP002	8779

				EXAMINER
22434	7590	10/06/2004		SALL, EL HADJI MALICK

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ART UNIT	PAPER NUMBER
2157	

DATE MAILED: 10/06/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 10/03)

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) ☒ Responsive to communication(s) filed on <u>28 June 2001</u>.

2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.

3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) ☒ Claim(s) <u>1-56</u> is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5) ☐ Claim(s) _____ is/are allowed.

6) ☒ Claim(s) <u>1-56</u> is/are rejected.

7) ☒ Claim(s) <u>10,32,33,44 and 55</u> is/are objected to.

8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) ☐ The specification is objected to by the Examiner.

10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a) ☐ All b) ☐ Some * c) ☐ None of:

      1. ☐ Certified copies of the priority documents have been received.

      2. ☐ Certified copies of the priority documents have been received in Application No. _____.

      3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☐ Other: _____.

1.   ***DETAILED ACTION***

This action is responsive to the application filed on June 28, 2001. Claims 1-56 are pending. Claims 1-56 represent technique for assigning schedule resources to multiple ports in correct proportions.

2.   ***Claim Objections***

Claims 10, 32, 33, 44 and 55 are objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form.

Claim 10 is objected to because of the following informalities: Claim 10 must depend on prior claim. In this case it depends on claim 14, which is in group claim 13. Appropriate correction is required. For purpose of prior art rejection in this office action, examiner will choose claim 10 as depending on claim 8.

Claim 32 is objected because of the following informalities: Claim 32 depends on claim 14, which is in group claim 23. Appropriate correction is required. For purpose of prior art rejection in this office action, examiner will choose claim 32 as depending on claim 30.

Claim 33 is objected because of the following formalities: Claim 33 fails to further limit the subject matter of claim 30 it depends. Appropriate correction is required. For purpose of prior art rejection in this office action, examiner will choose claim 33 as depending on claim 32.

Claim 44 is objected to because of the following informalities: Claim 44 depends on claim 14, which is in group claim 23. Appropriate correction is required. For purpose of prior art rejection in this office action, examiner will choose claim 44 as depending on claim 42.

Claim 55 is objected to because of the following informalities: Claim 55 depends on claim 14, which is in group claim 23, Appropriate correction is required. For purpose of prior art rejection in this office action, examiner will choose claim 55 as depending on claim 53.

3.   *Claim Rejections - 35 USC § 103*

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4.   Claims 1-56 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fan et al. U.S. 6,408,005 in view of Kalkunte et al. U.S. 6,470,016.

Fan teaches the invention substantially including dynamic rate control scheduler for ATM networks (see abstract).

Fan teaches a method for scheduling service of traffic relating to a plurality of different communication flows, each communication flow having a respective service need associated therewith, the method comprising:

determining a first service order for servicing the plurality of communication flows, the first service order being based upon the relative service needs of each of the plurality of communication flows (column 3, lines 24-26, Fan discloses a work-conserving scheduler basically determines the order in which queued cells should be serviced);

determining a new service need associated with the at least one communication flow (column 16, lines 6-10, Fan discloses a given queue is scheduled when the queue is empty and a new cell arrives to the queue...when the associated stream changes from the inactive to the active state. The basis formula for computing the new timestamp for scheduling...); and

automatically determining a second service order for servicing the plurality of communication flows, the second service order being based upon the relative service needs of each of the plurality of communication flows, including the new service need of the at least one communication flow (column 21, lines 7-19, Fan discloses...if the measured QoS falls below the target QoS, more bandwidth should be allocated to the stream...; column 22, lines 1-5, Fan discloses...a stream suffering from poor QoS automatically takes more of the available excess bandwidth compared with a stream which is meeting or exceeding its target QoS...).

Fan fails to teach detecting a change in the service need of at least one communication flow

However, kalkunte teaches servicing output queues dynamically according to bandwidth allocation in a frame environment. kalkunte teaches detecting a change in the service need of at least one communication flow (column 3, lines 50-56, Kalkunte discloses upon transmitting a frame, the number of bandwidth segments for the queue is decreased by the number of bandwidth segment in the

frame...the number of bandwidth segments for the queue is reduced, or forced to forfeit its bandwidth segments);

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Fan in view of Kalkunte to provide detecting a change in the service need of at least one communication flow. One would be motivated to do so to allow the reallocation of any remaining bandwidth segments to other queues (see abstract).

As to claim 2, Fan teaches the method of claim 1 wherein the determining of the first and second service orders is performed dynamically (abstract, Fan discloses each traffic stream associated with an internal switch queue is rate-shaped according to a rate which consists of a minimum guaranteed rate and a dynamic component computed based on congestion information within the switch).

As to claim 3, Fan teaches the method of claim 1 further comprising: calculating a respective service need indicator value for each of the communication flows, wherein the service need indicator value associated with a selected communication flow is inversely related to a degree of service need associated with the selected communication flow (column 19, lines 24-30, Fan discloses...we shall implicitly assume that all computed rates are multiplied by the indicator function $I_{[o,c]}(x)$ to ensure that the rates fall in the range [o,c]...).

As to claim 4, Fan teaches the method of claim 3 wherein the service need indicator value associated with the selected communication flow corresponds to a bit rate associated with the selected communication flow (column 5, lines 3-12, Fan discloses...Available Bit Rate (ABR) and Unspecified Bit Rate (UBR) are non-real time traffic, and are mainly used for computer communication...).

As to claim 5, Fan teaches the method of claim 3 wherein the service need indicator value associated with the selected communication flow corresponds to a line rate associated with a port associated with the selected communication flow (figure 1; column 1, lines 44-47, Fan discloses the SRC scheduler serves a queue I at the constant rate M_i and the output cell streams are fed to a common bottleneck queue CQ which is served at a given rate C).

As to claim 6, Fan teaches the method claim 3 wherein at least one of the service order determining operations includes using the service need indicator values to determine a service order for serving the plurality of communication flows (column 19, lines 24-30, Fan discloses...we shall implicitly assume that all computed rates are multiplied by the indicator function $I_{[o,c]}(x)$ to ensure that the rates fall in the range [o,c]...).

As to claim 7, Fan teaches the method of claim 3 further comprising:
Calculating the service need indicator value (I) associated with the selected communication flow according to: I = RANGE/R (column 19, lines 24-30, Fan discloses...we shall implicitly assume that all computed rates are multiplied by the indicator function $I_{[o,c]}(x)$ to ensure that the rates fall in the range [o,c]...; equation (44));; and
Wherein R corresponds to the degree of service need associated with the selected communication flow (column 19, lines 24-24, Fan discloses and A(n) is the set of 'active' stream s over the time interval ((n-1)...)); and
Wherein RANGE is a value at least equal to a summation of respective degree of service needs associated with each of the communication flows (column 19, line 24, Fan discloses where W_i is the weight assigned to stream i...).

As to claim 8, Fan teaches the method of claim 3 further comprising:

Calculating a respective time key value for each of the communication flows (column 16, formulas 39-40);

Wherein a least significant bit portion of a time key value associated with the selected communication flow corresponds to the service need indicator value associated with the selected communication (column 12, lines 26-27, Fan discloses where I.sub.[0,C] (x)=1 if (x) equals or larger than zero, but equal or less than C; otherwise, I.sub.[0,C] (x)=0); and

Wherein a least one of the service order determining operations includes using the time key values to determine a service order for servicing the plurality of communication flows (column 16, lines 1-3, Fan discloses The timestamp computations ensure that each stream is shaped to the appropriate rate, as determined by the DRC scheme).

As to claim 9, Fan teaches The method of claim 8 wherein a most significant bit portion of the time key value associated with the selected communication flow corresponds to an integer multiple of the service need indicator value associated with the selected communication flow (column 10, lines 36, Fan discloses wherein C is the rate of the common queue).

As to claim 10, Fan teaches the method of claim 8.

Fan fails to teach incrementing a most significant bit portion of the time key value associated with the selected communication flow each time the selected communication flow is serviced.

However Kalkunte teaches incrementing a most significant bit portion of the time key value associated with the selected communication flow each time the selected communication flow is serviced (figure 10, step 1004).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Fan in view of Kalkunte to provide incrementing a most significant bit portion of the time key value associated with the selected communication flow each time the selected communication flow is serviced. One

would be motivated to do so to allow the processing of queues having remaining bandwidth.

As to claim 11, Fan teaches the method of claim 10.

Fan fail to teach said incrementing includes incrementing the most significant bit portion of the time key value associated with the selected communication flow by an amount at least equal to the service need indicator value associated with the selected communication flow.

However, kalkunte teaches said incrementing includes incrementing the most significant bit portion of the time key value associated with the selected communication flow by an amount at least equal to the service need indicator value associated with the selected communication flow (figure 10, step 1016).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Fan in view of Kalkunte to provide said incrementing includes incrementing the most significant bit portion of the time key value associated with the selected communication flow by an amount at least equal to the service need indicator value associated with the selected communication flow. One would be motivated to do so to allow the processing of queues having remaining bandwidth.

As to claim 12, Fan teaches the system of claim 1 wherein the method is performed by a single scheduler configured to service traffic relating to the plurality of different communication flows (figure 4, item 30).

As to claim 23, Fan teaches a system for scheduling service of traffic relating to a plurality of different communication flows, each communication flow having a respective service need associated therewith, the system comprising:

at least one interface configured or designed to provide a communication link to at least one network device in a data network (figure 3, items X1(n)...XN(n));

the system being configured or designed to determine a first service order
for servicing the plurality of communication flows, the first service order being
based upon the relative service needs of each of the plurality of communication
flows (column 3, lines 24-26, Fan discloses a work-conserving scheduler
basically determines the order in which queued cells should be serviced);

the system being further configured or designed to determine a new
service need associated with the at least one communication flow (column 16,
lines 6-10, Fan discloses a given queue is scheduled when the queue is empty
and a new cell arrives to the queue...when the associated stream changes from
the inactive to the active state. The basis formula for computing the new
timestamp for scheduling...); and

the system being further configured or designed to automatically
determine a second service order for servicing the plurality of communication
flows, the second service order being based upon the relative service needs of
each of the plurality of communication flows, including the new service need of
the at least one communication flow (column 21, lines 7-19, Fan discloses...if the
measured QoS falls below the target QoS, more bandwidth should be allocated
to the stream...; column 22, lines 1-5, Fan discloses...a stream suffering from
poor QoS automatically takes more of the available excess bandwidth compared
with a stream which is meeting or exceeding its target QoS...).

Fan fails to teach the system comprising:

at least one processor;

memory; and

However, Kalkunte teaches at least one processor; memory (column 14-
15, lines 67, 1-4, Kalkunte discloses Scheduler 202 logic is implemented as a
set of computer program instructions that are stored in a computer readable
medium and executed by an embedded microprocessor system within the
scheduling device 200).

It would have been obvious to one of ordinary skill in the art at the time of
the invention to modify Fan in view of Kalkunta to provide at least one

processor; memory. One would be motivated to do so to allow bandwidth to be managed.

Fan fails to teach the system comprising:

the system being further configured or designed to detect a change in the service need of at least one communication flow.

However, kalkunte teaches the system being further configured or designed to detect a change in the service need of at least one communication flow (column 3, lines 50-56, Kalkunte discloses upon transmitting a frame, the number of bandwidth segments for the queue is decreased by the number of bandwidth segment in the frame...the number of bandwidth segments for the queue is reduced, or forced to forfeit its bandwidth segments);

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Fan in view of Kalkunte to provide detecting a change in the service need of at least one communication flow. One would be motivated to do so to allow the reallocation of any remaining bandwidth segments to other queues (see abstract).

Claims 1-22 and 24-56 do not teach or define any new limitations above claims 1-12 and 23, and therefore are rejected for similar reasons.

5.   Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to El Hadji M Sall whose telephone number is 703-306-4153. The examiner can normally be reached on 8:00-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ario Etienne can be reached on 703 308-7562. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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free).

El Hadji Sall
Patent Examiner
Art Unit: 2157

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PRIMARY EXAMINER